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(54) **BIO-CHIP PACKAGE WITH WAVEGUIDE
INTEGRATED SPECTROMETER**

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(57) **ABSTRACT**

A bio-chip package comprises a substrate a first layer over the substrate comprising an image sensor. The bio-chip package also comprises a second layer over the first layer. The second layer comprises a waveguide system a grating coupler. The bio-chip package also comprises a third layer arranged to accommodate a fluid between a first-third layer portion and a second-third layer portion, and to allow the fluid to pass from a first side of the third layer to a second side of the third layer. The third layer comprises a material having a predetermined transparency with respect to a wavelength of a received source light, the waveguide system is configured to direct the received source light to the grating coupler, and the image sensor is configured to determine a change in the wavelength of the source light caused by a coupling between the source light and the fluid.

20 Claims, 6 Drawing Sheets

